

REMARKS/ARGUMENTS

The Applicant thanks the examiner for his report.

New claim 37 has been added to claimed that the solvent is present in an amount at least 5% by weight of the solvent system.

New claim 38 has been added to claim the mutual solvent system recited in paragraph 7.

New claim 39 has been added to claim the mutual solvent system recited in paragraph 11.

New claim 40 has been added to claim one of the mutual solvent system examples recited in the table of paragraph 12.

New claim 41 has been added to claim a solvent comprising methanol, methyl acetate, hydrochloric acid, and methyl ethyl ketone.

New claim 42 has been added to exclude an emulsifying agent.

New claim 43 has been added to claim that the mutual solvent system of claim 1 consists essentially of the alcohol, the ester, the aqueous acid, and the solvent.

New claim 44 has been added to claim the use of the mutual solvent system in a well operation.

The Applicant has amended claim 1 to clarify that the mutual solvent system consists essentially of water soluble and water and oil soluble components.

Claims 1, 10, and 30-36 have been rejected under 35 USC 103(a) as being unpatentable over Watkins. Applicants respectfully traverse this rejection.

Watkins discloses a treating composition that comprises an emulsified mixture of an aqueous acid component and an organic solvent component.

In contrast, the Applicant's claim 1 requires a mutual solvent system consisting essentially of water soluble and water and oil soluble components. Support for this limitation can be found in the specification as filed, including the original claim 1 as filed.

Prior treating compositions such as those disclosed by Watkins and the references referred to in the Applicant's background information section employ a) an aqueous acid component for dissolving scale and acid-soluble materials (Watkins col. 1, lines 20-22), and b) an organic solvent for dissolving oil-soluble organic materials that tend to coat the acid-soluble materials (Watkins col. 1, lines 22-24 and 37-43). Exemplary organic materials that the organic solvent is intended to dissolve are paraffins, viscous oil, tar, wax, asphaltenes, and resin precipitates of petroleum origin (Watkins col. 1, lines 37-40).

The organic solvent and aqueous acid component may be combined by emulsification into a single mixture prior to injection, as Watkins teaches. Components of the organic solvent may have some water solubility, although this is not required. Regardless, a skilled worker reading Watkins would have understood that a preferred composition would afford the maximum allowable oil-solubility of the organic solvent while still being able to achieve a stable emulsion. This skilled worker would also understand that regardless of the preferability of the organic solvent, the organic solvents contemplated would be immiscible with water and will therefore always require emulsification to mix with the acid (column 9, lines 1-4 and lines 24-29, claim 1).

In contrast, the Applicant's claim 1 requires a mutual solvent system consisting essentially of water soluble and water and oil soluble components, the mutual solvent system comprising:

an alcohol that is water soluble present in the amount of at least 5% by weight of the mutual solvent system;

an ester that is water and oil soluble present in the amount of at least 5% by weight of the mutual solvent system;

an aqueous acid comprising water and acid, the aqueous acid being present in an amount at least 5% by weight of the mutual solvent system; and

a solvent that is at least one of a ketone that is water and oil soluble and a cyclic ether that is water and oil soluble.

In contrast to Watkins, the Applicant submits that a mutual solvent system consisting essentially of water soluble and water and oil soluble components is guaranteed to be predominantly water and acid soluble with comparatively low oil solubility. A skilled worker would understand this to be the case because all of the elements of the claimed mutual solvent system are water or have water solubility, while not every element has oil solubility.

The Applicant submits that its particular claimed system is distinct from Watkins' disclosed compositions. Because it has comparatively low oil-solubility, the Applicant's claimed system does not substantially dissolve oil-based organic materials as Watkins compositions do. However, the Applicant has discovered that the particular claimed combination creates interfacial tension with oil-based organic materials, acting to loosen and liberate the organic materials from the surface of acid-solubles. The liberated organic materials may then float to the surface of the mutual solvent system, while the aqueous acid is free to work on and dissolve the acid-soluble materials beneath. This has resulted in an effective mutual solvent system for acidization.

The Applicant's claimed mutual solvent system possesses a number of advantages over prior compositions such as Watkins. Firstly, less volume of the claimed system is required to sufficiently clear organic materials that cover the acid-soluble materials, since the claimed system doesn't have to dissolve all of the organic material to remove it. For this reason, the claimed system is also less expensive to produce and dispose of. Secondly, because the claimed system consists essentially of water soluble and water and oil soluble components, the claimed system will have a uniform composition, which affords more effective contact and dissolution of scale and acid-solubles. In contrast, an emulsion, which has a varying and suspended composition, may require vigorous stirring, continuous movement, or lengthy contact times in order to dissolve a targeted material. Thirdly, as previously indicated, no emulsifying agents are required. Emulsifiers are expensive, and the cost benefit alone of not being required to add an emulsifier results in a cheaper product.

Thus, the Applicant submits that Watkins teaches water immiscibility and greater oil-solubility, whereas the Applicant teaches essentially the opposite. Thus, Watkins teaches away from the Applicant's claimed system, since Watkins takes a completely different approach to solving the same problem. Although Watkins discloses that his organic solvent component may include a polar solvent that may be an alcohol, an ester, a ketone, or mixtures thereof (col. 8, line 1 to col. 9, lines 1), the fact that the intended purpose of his organic solvent is to dissolve organic materials teaches the skilled worker away from contemplation of the Applicant's claimed invention. Thus, the Applicant's invention as defined by claim 1 represents a dramatic and unobvious departure from Watkins.

To further emphasize the distinction between the Applicant's claimed invention and Watkins, the Applicant has added new claim 42 that specifically excludes emulsifying agents.

Thus, the Applicant submits that its mutual solvent system of claim 1 is not obvious in view of Watkins. Thus, the Applicant submits that claim 1, and hence all claims dependent on claim 1, are patentable.

Reconsideration and withdrawal of the rejections, and allowance of the claims, is respectfully requested.

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Respectfully submitted,



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